

Application No.: 10/505,249

Amendment dated November 28, 2005

Reply to Notice Of Allowance And Fee(s) Due dated November 16, 2005

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Amendments to the Claims:

If entered, this listing of claims will replace all prior versions and listings of claims in the subject application. Please amend the claims as follows:

Claim 1. (Previously presented): A system for cleaning tubing used for conducting a fluid therethrough, the tubing being connected to an inlet pipe and an outlet pipe, the system having
a plurality of cleaning balls for circulating with the fluid through the tubing;
a separator 12 disposed at the outlet pipe 9, the separator 12 being housed within an enlarged section of the outlet pipe 33 and arranged to separate the cleaning balls 20 from the fluid;

a recirculating means comprising:

a housing 21 arranged to collect the cleaning balls 20, the housing 21 having a first compartment 19 and second compartment 27 separated by an apertured partition 28, the apertured partition 28 arranged to allow the fluid to pass through to the second compartment 27 but not the cleaning balls 20;

a ball supply pipe consisting essentially of a ball supply pipe 24 having an entrance 26 coupled to a first opening on the first compartment 19 of the housing 21 and an exit 3 coupled to a first opening on the inlet pipe 5, a first one-way valve CV1 disposed along the ball supply pipe 24 and a fourth valve HV1 disposed along the ball supply pipe 24;

a fluid supply pipe 23 having an entrance 2 coupled to a second opening on the inlet pipe 5 and an exit 22 coupled to a second opening on either the first compartment 19 or the second compartment 27 of the housing 21;

a fluid return pipe 16 having an entrance 30 coupled to an opening on the second compartment 27 of the housing 21 and an exit 14 coupled to an opening on a section of the outlet pipe 15 after the separator 12; and

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a ball return pipe consisting essentially of a ball return pipe 17 having an entrance 13 coupled to an opening on the separator 12 and an exit 31 coupled to a third opening on the first compartment 19 of the housing 21, a second one-way valve CV2 disposed along the ball return pipe 17 and a third valve HV2 disposed along the ball return pipe 17;

a means for supply of cleaning balls to the inlet pipe 5 whereby a higher pressure is formed at the entrance 2 of the fluid supply pipe 23 and a lower pressure is formed at the exit 3 of the ball supply pipe 24, the difference in pressure causing a transfer of cleaning balls 20 from the housing 21 to the inlet pipe 5; and

a means for a return of cleaning balls 20 to the housing 21,

whereby a higher pressure is formed at the entrance 13 of the ball return pipe 17 and a lower pressure is formed at the exit 14 of the fluid return pipe 16, the difference in pressure causing a transfer of cleaning balls 20 from the separator 12 back to the housing 21, and

wherein the recirculating means, means for supply of cleaning balls and means for return of cleaning balls are arranged to selectively transfer the plurality of cleaning balls 20 from the inlet pipe 5 to the outlet pipe 9.

Claim 2. (Currently amended): A cleaning system according to claim 1, wherein the recirculating means further comprises a first valve V1 disposed along the fluid supply pipe 23 and a second valve V2 disposed along the fluid return pipe 16,[[;]] the first one-way valve CV1 being operative to transfer the cleaning balls 20 from the housing 21 to the inlet pipe 5 and the second one-way valve CV2 ~~CW2~~ being operative to transfer the cleaning balls 20 from the separator 12 to the housing 21.

Claim 3. (Previously presented): A cleaning system according to claim 1, wherein the recirculating means further comprises the third valve HV2 disposed along the ball return pipe 17 and the fourth valve HV1 disposed along the ball supply pipe 24.

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Claim 4. (Previously presented): A cleaning system according to claim 1, wherein the means for supply of clean balls 20 further comprises a first valve V1 and a second valve V2, whereby opening of the first valve V1 and keeping the second valve V2 closed, owing to a higher pressure at the entrance 2 of the fluid supply pipe 23 and a lower pressure at the exit 3 of the ball supply pipe 24, allows the pressure difference to create a suction force to draw the fluid from the inlet pipe 5 into the housing 21 through the fluid supply pipe 23, the force of the fluid flowing through the housing 21 carrying the cleaning balls 20 from the housing 21 through the first one way valve CV1, into the ball supply pipe 24, and into the inlet pipe 5.

Claim 5. (Previously presented): A cleaning system according to claim 1, wherein the means for the return of cleaning ball 20 further comprises a second valve V2 and a first valve V1, whereby opening of the second valve V2 and the keeping of the first valve V1 closed, owing to a higher pressure at the entrance of the ball return pipe 17 and a lower pressure at the exit 14 of the fluid return pipe 16, allows the pressure difference to create a suction force to draw the fluid and the cleaning balls 20 from the separator 12 through the second one way valve CV2 and into the ball return pipe 17, the suction force of the fluid carrying the cleaning balls 20 through the second one-way valve CV2, into the ball return pipe 17 into the housing 21, wherein said cleaning balls 20 are retained in the housing 21 while the fluid flows through the apertured partition 28 in the housing 21 to return to the fluid return pipe 16 and into the outlet pipe 15 which is smaller in diameter than the enlarged section of the outlet pipe 33 containing the separator 12.

Claim 6. (Previously presented): A cleaning system according to claim 1, wherein the separator 12 is in a shape of a funnel.

Claim 7. (Original): A cleaning system according to claim 6, wherein the separator 12 comprises perforations which allow the fluid to flow through but not the cleaning balls 20.

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Claim 8. (Original): A cleaning system according to claim 7, wherein the perforations are in the form of rectangular slots 32 each having a length direction.

Claim 9. (Original): A cleaning system according to claim 8, wherein the length directions of the rectangular slots 32 are not parallel to the centre axis of the funnel.

Claim 10. (Previously presented): A cleaning system according to claim 1, further comprising a device 4 to rotate the fluid and the cleaning balls 20 at the inlet pipe 5 before the tubing 8.

Claim 11. (Previously presented): A cleaning system according to claim 1, further comprising a device 10 to rotate the fluid and the cleaning balls 20 at the outlet pipe 9 before the separator 12.

Claim 12. (Previously presented): A cleaning system according to claim 9, further comprising a device 10 to rotate the fluid and the cleaning balls 20 at the outlet pipe 9 before the separator 12, wherein the direction of the rotational device is opposite to the length direction of the rectangular slots 32.

Claim 13. (Canceled)

Claim 14. Previously presented): A cleaning system according to claim 9, wherein the rectangular slots 32 have a length direction inclined clockwise/anti-clockwise, as viewed in the fluid flow direction.